# UNITED STATES PATENT AND TRADEMARK OFFICE

| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 09/778,087 | 02/07/2001 | Takahiro Ishikawa | 1538.1010 | 4567 |

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| EXAMINER |
|---|
| YIGDALL, MICHAEL J |

| ART UNIT | PAPER NUMBER |
|---|---|
| 2122 | |

DATE MAILED: 08/13/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

| | Application No. | Applicant(s) |
|---|---|---|
| **Office Action Summary** | 09/778,087 | ISHIKAWA ET AL. |
| | Examiner | Art Unit | |
| | Michael J. Yigdall | 2122 | |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
  Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on <u>*27 April 2004*</u>.

2a)☒ This action is **FINAL**.     2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) <u>*1-12*</u> is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) <u>*1-12*</u> is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☐ All    b)☐ Some * c)☐ None of:

       1.☐ Certified copies of the priority documents have been received.

       2.☐ Certified copies of the priority documents have been received in Application No. _____.

       3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
    Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413)
    Paper No(s)/Mail Date. _____.

5) ☐ Notice of Informal Patent Application (PTO-152)

6) ☐ Other: _____.

## DETAILED ACTION

1.      This Office action is in reply to Applicant's response and amendment dated April 27,

2004. Claims 1-12 remain pending.

### *Response to Arguments*

2.      Applicant's arguments have been fully considered but they are not persuasive.

Applicant contends that Palay is silent as to teaching or suggesting, "said execution

statement to be executed in parallel or in said parallelization directive included in a class," and is

thereby silent as to teaching or suggesting, "generating an instruction to call a construction

instruction routine for an object of the class, before said execution statement to be executed in

parallel or an execution statement to be parallelized by said parallelization directive, in order to

generate said object in addition to an original object of the class" (see page 7, paragraph 5).

Likewise, Applicant contends that Umekita is silent as to teaching or suggesting, "said execution

statement to be executed in parallel or in said parallelization directive included in a class," and

"generating an instruction to call a construction instruction routine for an object of the class,

before said execution statement to be executed in parallel or an execution statement to be

parallelized by said parallelization directive."

However, Martin discloses a compiler for a distributed object system (see the abstract),

having parallelization comments or directives (see column 7, line 50 to column 8, line 5, and

column 8, lines 59-63), as set forth in the claim rejections below. When an object of a class is to

be executed in parallel, the system generates constructor code to instantiate a number of the

objects in additional to the original (see column 9, lines 48-54), for the purpose of ensuring high

availability (see column 9, lines 35-38).

## *Claim Rejections - 35 USC § 103*

3.      The text of those sections of Title 35, U.S. Code not included in this action can be found

in a prior Office action.

4.      Claims 1-3, 5-7 and 9-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over

U.S. Pat. No. 5,613,120 to Palay et al. (art of record; hereinafter "Palay") in view of U.S. Pat.

No. 6,438,746 to Martin (hereinafter "Martin").

With respect to claim 1 (currently amended), Palay discloses a compiler embodied on a

medium (see compiler 104 and storage medium 208 in FIG. 2) to compile a source program in an

object-oriented programming language (see the title and abstract), said compiler comprising:

(a) if a class-type variable is contained in an execution statement, said execution

statement included in a class, generating an instruction to call a construction instruction routine

for an object of the class, before said execution statement, in order to generate said object (see

column 27, line 65 to column 28, line 11, which shows generating a constructor, i.e. an

instruction to call a construction instruction routine, when a class is defined, i.e. when a class-

type variable is contained in an execution statement; note that the constructor is included in the

class and that the constructor inherently generates an object of the class before the object can be

used by an execution statement); and

(b) if a class-type variable is contained in said execution statement, said execution

statement included in the class, generating said instruction to call a destruction instruction

routine for the generated object of the class, after said execution statement, in order to destruct

the generated object (see column 27, line 65 to column 28, line 11, which shows generating a

destructor, i.e. an instruction to call a destruction instruction routine, when a class is defined, i.e.

when a class-type variable is contained in an execution statement; note that the destructor is

included in the class and that the destructor inherently destructs an object of the class after the

object has been generated by an execution statement).

Palay does not expressly disclose the limitations wherein the execution statement is to be

executed in parallel or parallelized by a parallelization directive, and wherein the objects are

generated and destructed in addition to original objects of the class.

However, Martin discloses a compiler for a distributed object system (see the abstract),

having parallelization comments (see column 7, line 50 to column 8, line 5) or directives (see

column 8, lines 59-63). When an object of a class is to be executed in parallel, the system

generates constructor code to instantiate a number of the objects in additional to the original (see

column 9, lines 48-54), in order to ensure high availability (see column 9, lines 35-38). Martin

further discloses that the system may be integrated with a conventional compiler (see column 2,

lines 25-29).

It would have been obvious to one of ordinary skill in the art at the time the invention

was made to supplement the system of Palay with the distributed object features taught by

Martin, so that a program may be compiled for parallel execution with high availability.

With respect to claim 2 (currently amended), Palay in view of Martin further discloses:

when generating an intermediate language from said source program (see step 506 in

FIG. 5; see also column 8, lines 50-55, which shows generating an object file, and FIG. 1, which

shows that the object file is an intermediate representation),

(a) allocating a construction and destruction instruction information region in the

intermediate language of the class, if a class variable which has possibility to be executed in

parallel is specified (see class information region 406 in FIG. 4 and column 12, lines 10-14; note

that the class information is generated for all classes, including those for which parallel

execution is possible); and

(b) storing into said construction and destruction instruction information region,

information concerning said construction instruction routine and said destruction instruction

routine of an object of the class (see column 12, lines 15-26, which shows storing information

into the class information region, and column 27, line 39 to column 28, line 11, which further

shows storing information regarding the constructor and destructor), and

wherein information stored in said construction and destruction instruction information

region is used in said steps of generating said instruction to call said construction instruction

routine and generating of said instruction to call said destruction instruction routine (see column

12, lines 27-33, which shows that the information is used by the linker for generating class

instances, and column 27, line 65 to column 28, line 7, which further shows that the linker uses

the information regarding the constructor and destructor).

With respect to claim 3 (currently amended), Palay in view of Martin further discloses

the limitation wherein said construction and destruction instruction information region is

structured so as to be accessed from the type information of said class (see FIG. 4, which shows

the structure of the object file, and column 12, lines 52-59, which shows that the information

corresponds to the type information of a class).

With respect to claim 5 (currently amended), the limitations recited in claim 5 are

analogous to those of claim 1 (see the explanation for claim 1 set forth above).

With respect to claim 6 (currently amended), the limitations recited in claim 6 are

analogous to those of claim 2 (see the explanation for claim 2 set forth above).

With respect to claim 7 (original), the limitations recited in claim 7 are analogous to those

of claim 3 (see the explanation for claim 3 set forth above).

With respect to claim 9 (currently amended), the limitations recited in claim 9 are

analogous to those of claim 1 (see the explanation for claim 1 set forth above).

With respect to claim 10 (currently amended), the limitations recited in claim 10 are

analogous to those of claim 2 (see the explanation for claim 2 set forth above).

With respect to claim 11 (original), the limitations recited in claim 11 are analogous to

those of claim 3 (see the explanation for claim 3 set forth above).

5.      Claims 4, 8 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Palay

in view of Martin, as applied to claims 1, 5 and 9 above, respectively, and further in view of U.S.

Pat. No. 5,452,461 to Umekita et al. (art of record; hereinafter "Umekita").

With respect to claim 4 (original), although Palay discloses a computer having one or more processors and a main memory (see FIG. 2 and column 8, lines 16-28), and Martin discloses a compiler for a distributed system (see FIG. 2 and column 4, lines 15-20), Palay in view of Martin does not expressly disclose the limitation wherein said compiler is a compiler for a parallel computer with shared memory.

However, Umekita discloses a compiler for a parallel computer with shared memory (see parallel compiler 213 in FIG. 27, and column 5, lines 30-27, which shows a computer having a plurality of processors and shared memory), in a system for parallelizing a source program (see the title and abstract) so that it may be executed in parallel with high efficiency (see column 1, lines 41-53).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to implement the system of Palay and Martin in a parallel computer with shared memory, as taught by Umekita, in order to achieve high efficiency.

With respect to claim 8 (original), the limitations recited in claim 8 are analogous to those of claim 4 (see the explanation for claim 4 set forth above).

With respect to claim 12 (original), the limitations recited in claim 12 are analogous to those of claim 4 (see the explanation for claim 4 set forth above).

## *Conclusion*

6.      The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. U.S. Pat. No. 6,256,779 to Martin discloses distributed processing of objects. U.S.

Pat. No. 5,999,987 to O'Farrell et al. discloses concurrent processing in object-oriented

languages.  U.S. Pat. No. 6,092,097 to Suzuoka discloses a parallel processing system.

7.      Applicant's amendment necessitated the new ground(s) of rejection presented in this

Office action.  Accordingly, **THIS ACTION IS MADE FINAL**.  See MPEP § 706.07(a).

Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

        A shortened statutory period for reply to this final action is set to expire THREE

MONTHS from the mailing date of this action.  In the event a first reply is filed within TWO

MONTHS of the mailing date of this final action and the advisory action is not mailed until after

the end of the THREE-MONTH shortened statutory period, then the shortened statutory period

will expire on the date the advisory action is mailed, and any extension fee pursuant to 37

CFR 1.136(a) will be calculated from the mailing date of the advisory action.  In no event,

however, will the statutory period for reply expire later than SIX MONTHS from the date of this

final action.

8.      Any inquiry concerning this communication or earlier communications from the

examiner should be directed to Michael J. Yigdall whose telephone number is (703) 305-0352.

The examiner can normally be reached on Monday through Friday from 7:30am to 4:00pm.

        If attempts to reach the examiner by telephone are unsuccessful, the examiner's

supervisor, Tuan Q. Dam can be reached on (703) 305-4552.  The fax phone number for the

organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent
Application Information Retrieval (PAIR) system. Status information for published applications
may be obtained from either Private PAIR or Public PAIR. Status information for unpublished
applications is available through Private PAIR only. For more information about the PAIR
system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private
PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

MY                     Michael J. Yigdall
                       Examiner
                       Art Unit 2122

mjy

TUAN DAM
SUPERVISORY PATENT EXAMINER